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# CROSS-SECTORAL ISSUES, WITH PARTICULAR REFERENCE TO THE CRITICAL ELEMENTS OF SUSTAINABILITY

## Letter dated 19 December 1995 from the Chargé d'affaires a.i. of the Permanent Mission of the Republic of Korea to the United Nations addressed to the Secretary-General

It gives me great pleasure to transmit herewith a copy of the report on the Workshop on Policy Measures for Changing Consumption Patterns. Hosted by the Government of the Republic of Korea, this Workshop was held in Seoul from 30 August to 1 September 1995.

The Workshop constituted one of the Republic of Korea's contributions to the preparatory process for the fourth session of the Commission on Sustainable Development. Its conclusions concerning policy measures for changing consumption patterns provide a valuable input to the ongoing work of the Commission.

I would highly appreciate it if you would arrange for the report, which is available in English only, to be circulated as an official document of the fourth session of the Commission under item 3 of the provisional agenda.

(Signed) Wonil CHO
Ambassador, Chargé d'affaires a.i.
Republic of Korea

* E/CN.17/1996/1, to be issued.

Annex

# REPORT OF THE WORKSHOP ON POLICY MEASURES FOR CHANGING CONSUMPTION PATTERNS

## I. INTRODUCTION

1. In the past decade, we have witnessed a dramatic change in the way in which we view our environment. Overcoming environmental challenges is now emerging as a basic element in all national and international development strategies. The global community has responded to these challenges with efforts to articulate principles and guidelines for sustainable development, as embodied in Agenda 21 programs.

2. The continuing unsustainable trends in consumption and production patterns is undeniably contributing greatly to the continued deterioration of the environment. Thus, changing these patterns has become an urgent item on the global agenda for sustainable development.

3. In response to these developments with the international community, the Government of the Republic of Korea, in collaboration with the Government of Australia, the UN Department for Policy Co-ordination and Sustainable Development, the United Nations Development Programme and the Organisation for Economic Co-operation and Development, hosted an international Workshop on Policy Measures for changing Consumption Patterns in Seoul, Korea from 30 August to 1 September 1995.

4. The vision of this workshop was to promote and facilitate the development of appropriate policy measures for sustainable consumption with the following objectives: to evaluate the problems caused by unsustainable trends in consumption through case studies and discussions; to exchange information and experiences that may assist countries in establishing more effective policies; and to motivate governments, businesses and NGOs to assume their responsibilities and roles required for implementing policy measures.

5. The Workshop proceeded with the following four areas of discussion:

(a) Setting the sustainable consumption agenda;
(b) Developing policy options and instruments;
(c) Targeting the specific policy areas; end-use energy consumption, waste management, consumptive use of water resources;
(d) Sharing responsibility toward the sustainable goal.

6. The Workshop was designed to contribute to the international work programme of the UN Commission on Sustainable Development agreed to at its third session in April 1995. It was built upon a number of earlier events, notably the Oslo Round Tables on Sustainable Production and Consumption (Norway, January 1994 and February 1995), the OECD Experts Seminar at MIT (USA, December 1994), the Workshop on Facilities for a

Sustainable Household (The Netherlands, January 1995), and the OECD Workshop on "Clarifying the Concepts" (Norway, July 1995).

7. The organizing body strived to achieve well-balanced representation from all countries, inter-governmental organizations and NGOs in various aspects. In all, representatives of 24 nations, 5 UN and international organizations, 9 NGOs and many environmental experts participated in this Workshop. The discussions and exchange of ideas by all participants attributed to its successful conclusion. Mr. Henrique Cavalcanti, the Chairman of the third CSD session; Mr. James Speth, the Administrator of UNDP; and Mr. Bill Long, Director of the OECD/Environment Directorate provided valuable insights by sharing their expertise and accumulated experiences as heads of their respective organizations.

8. Based on the presentations and discussions by the participants, the workshop produced the Chairman's Conclusions which presents policy recommendations for changing sustainable consumption patterns. These recommendations are expected to provide the conceptual foundations for policy action, and will hopefully contribute to the establishment of an international workplan to be presented at the fourth session of the CSD in 1996.

## II. SETTING THE SUSTAINABLE CONSUMPTION AGENDA

9. The workshop sought to build on work undertaken by intergovernmental organizations, national government and members of the non-government community. In this respect the Workshop acknowledged the outcomes of the Oslo Round Tables on Sustainable Production and Consumption (Norway, January 1994 and February 1995), the OECD Experts' Seminar at MIT (USA, December 1994), and the Workshop on Facilities for a Sustainable Household (The Netherlands, January 1995), and the OECD Workshop on 'Clarifying the Concepts' (Rosendal, Norway, July 1995). The Workshop reflected on the call from the Rosendal workshop for development of common language, increased attention to measurement of consumption and increased understanding of the linkages of consumption patterns to trade, investment, technology transfer and development issues.

10. Reflecting on the importance of international attention to the issue of sustainable consumption, the workshop considered the work of the Commission on Sustainable Development and the need to view sustainable consumption against the background of the global need to reduce poverty. At the national level, the importance of ensuring the complementarity of economic, regulatory and social measures was highlighted. Two types of policy failures, which could contribute to unsustainable consumption were identified: market failure to include environmental costs in prices; and policy failures which resulted in government actions having negative environmental outcomes. The complexity of the relationship between consumption and production highlighted the importance of life-cycle

analysis. Some globalized aspects of the issue suggested harmonized approaches between governments.

11. In sharing national experiences, a presentation on the Norwegian experience emphasized the long term structural changes in the economy and life-styles that were necessary to achieve sustainable consumption. Governments needed to take a wide range of measures, which were described in the context of the Action Plan for Sustainable Consumption which the Norwegian Government is preparing. The Norwegian approach emphasized the need for all groups in society to be involved and to accept their responsibilities. This included NGOs and industry. Provision of information to these groups was emphasized.

12. The Korean experience of rapid growth from the 1960s which had led to high growth in both production and consumption had also produced attendant environmental problems and public demand for environmental protection. Korean approaches to addressing these issues were described as including advances in product regulation and technological improvements. Social measures, especially education from an early age, were identified as essential to achieving sustainable consumption.

13. In the ensuing discussion in this session, there were several main themes. One was to note the limits of some economic instruments, such as taxes in relation to the very poor who might be largely outside the money economy. Another was on the empowerment of social groups, especially women. Women were identified as potentially having a special role in promoting sustainable consumption: as educators of children; purchasers for households; and as a group with particular environmental consciousness. There was discussion on how to deal with structural change in industry, particularly where industries with high environmental costs sought to relocate to developing countries.

14. The meeting recognized that choosing the most appropriate mix of policy instruments to address a particular consumption concern in an individual country was a complex issues facing decision makers. Most effective results could be achieved when environmental considerations were integrated across all areas of national decision making.

15. The meeting recognized that not all types of instruments are appropriate to all situations and decision makers must be guided by local conditions. At different stages in their development countries may choose to emphasize more strongly the economic, social, or environmental aspects of sustainable development. Over time, all elements will be important.

16. Gaining political acceptability for the choice of instruments is an important consideration and requires the concerns of all stakeholder to be addressed. Choosing the most cost-effective instrument can assist in gaining acceptance of policy measures, particularly where the measure offers an incentive to industry to innovate to save material

costs. Accurate information for all consumers is essential to achieving acceptance of any policy measure.

## III. DEVELOPING POLICY OPTIONS AND INSTRUMENTS FOR CHANGING CONSUMPTION PATTERNS

17. In the second session, the workshop participants discussed polity options and instruments aimed at changing unsustainable consumption patterns. Four paper were presented that examined the existing policy measures from different perspectives, based on specific national contexts. The advantages and weaknesses of the various instruments were evaluated, followed by reviews of lessons that could be learned and applied in ongoing and future efforts at advancing sustainable consumption.

18. It was pointed out that, since UNCED, considerable changes had taken place in developed countries' attitudes toward changing production and consumption patterns. There was a broadening appreciation among OECD countries that achieving sustainability in resource consumption was in their own interests. This new attitude was accompanied by a growing confidence that major changes in production and consumption patterns could be achieved without threatening economic prosperity and standards of living. Economic growth could be de-coupled from levels of resource use and pollution. Businesses that sought eco-efficiency could also be among the most profitable.

19. Along with this new development was a shift away from focusing exclusively on supply-side management in resource consumption to equal emphasis on both supply-side and demand-side management. The result of such a shift was the increasing involvement of consumers in the pursuit of sustainability in consumption. Significantly, this new emphasis on consumers was not simply confined to households, but also encompassed businesses and governments at different levels, reflecting the increasing recognition that achieving sustainable consumption constituted a common challenge involving the whole of civic society.

20. After highlighting the significance of these developments, which in themselves constituted important steps toward the goal of sustainable consumption, the workshop reviewed recent experiences of policy instruments applied at the national level. Empirical studies suggested that by and large governments have adopted a mixture of regulatory measures (command and control), market-based incentive/disincentive policies (economic instruments) and a variety of education, information and other persuasive means intended to influence consumer behaviour (social instruments). While regulatory measures had been the main instruments adopted in the early efforts at changing production and consumption patterns, governments were increasingly relying on economic and social instruments to bring about sustained changes in consumption patterns while at the same time maximizing the cost-effectiveness of these measures.

21. Country experiences also demonstrated that while command-and-control measures might have been costly in some situations, they have generally been successful in arresting the deteriorating trends in environmental degradation and pollution in a number of areas. Such was the case in reducing emissions and improving ambient air quality, and in cleaning up waste sites and water streams. An important outcome was the protection of public health and widespread acceptance of environmental standards.

22. On the other hand, regulatory measures have had limited or little effect on overall levels or patterns of resource consumption, such as energy and waste generation. Recent criticisms of the cost-effectiveness of such measures in some sectors led to fresh attempts at exploring the further use of other instruments, especially economic instruments that were considered more cost-effective.

23. The use of economic instruments has grown in recent years; from 1987 to 1993, their use increased by large margins in OECD countries, in some cases by as much as 50 percent. This was especially true in the Nordic countries, the Netherlands and the USA. Those of particular relevance to consumption were product charges, including differentiated energy taxes, and various deposit-refund schemes. Of far-reaching significance was the fact that such measures were also being adopted in more and more developing countries, indicating the great potentials of consumer response to incentive mechanisms, despite differences in relative income levels.

24. In some countries, like Sweden, the administrative costs of taxes and charges designed to bring about behavioral changes and/or create revenues had proved strikingly low. Administrative costs incurred in collecting sulfur dioxide and nitrogen oxide accounted for less than 1 per cent of turnover. The direct effects on $SO_2$ and NOx emissions were however substantial. Given the concerns associated with the introduction of environmental taxes or charges, this experience showed that with proper design and operation, economic instruments could be applied with significant and far-reaching results.

25. Nevertheless, it had to be noted that economic instruments that were also volume-based or -related had been less common in OECD countries, despite the widely-held belief that they were more cost-efficient and tended to yield greater impact on consumer behaviour. Interestingly, a volume-based waste charge scheme was now implemented in Korea. Although country situations might vary, economic analysis suggested that the overall impact of economic instruments such as taxes or charges would be influenced by several common variables, notably elasticities of substitution, supply, and demand. The behaviour of these elasticities would determine to a large extent the responsiveness of producers and consumers to the use of economic instruments.

26. In addition to regulatory measures and economic instruments, the workshop also heard a presentation on social instruments. It was pointed out that alongside these two types of policy instruments, social instruments played an important role in enhancing popular awareness and participation in furthering sustainable consumption.

27. In general, social instruments could include education, both formal and informal, consumer information campaigns, advertising and voluntary agreements. Under information and advertising eco-labelling could also be included, which had been gaining increasing importance recently as an effective means of facilitating behaviour changes.

28. A distinguishing feature of social instruments was the importance attached to the dynamics of stakeholders. Consumers, be they households, businesses or governments, were recognized as actors in their own rights, initiating actions and responding to initiatives at once, carrying on a dynamic process of interactions. While governments may take actions to inform and protect average consumers, consumers themselves may organize themselves into action groups and associations. The eco-teams in the Netherlands organized by the Global Action Plan (GAP), a nongovernmental organization, provided a telling example of how ordinary consumers could take initiatives and put sustainable consumption into daily practice.

29. It was therefore widely recognized that information played an instrumental role in galvanizing the civic society into action. To maximize effect and maintain momentum, information should not only raise awareness but also serve to make people aware of how and what to change in terms of consumption patterns and levels. Furthermore, community-level experiences pointed to the need for putting in place feed-back mechanisms so that consumers could appreciate the progress they were making as well as the impact on the behaviour of other stakeholders.

30. The experience in the Netherlands and other countries, as witnessed in the growing number of consumer initiatives, underlined the empowerment effect of consumers once they were organized. While individual behaviour was always praiseworthy and necessary, it was through group actions that individual effects could be amplified, sustained and reach a wider segment of the civic society. Between the start of the program and the initiation of evaluation, participants in the Dutch Eco-team activities achieved reductions in resource consumption and waste, ranging from 13 per cent (water) to 77 per cent waste, as compared to the average Dutch citizens' consumption level.

31. An issue so far neglected and now gaining increasing recognition as a key condition for sustaining momentum for behavioral changes was the provision of necessary infrastructure and other facilities geared to patterns of sustainable consumption. The availability of and easy access to such "hardware" might well determine the scale and durability of popular initiatives. In this regard, the role of governments in providing and facilitating the provision of such "hardware", through involvement of producers and retailers, was of crucial importance.

32. Recent emphasis on extending producer responsibility toward the final links in the chain of a product's life cycle also pointed to the role of producers in ensuring success in changing consumption patterns. Through negation and persuasion, governments and businesses had come to voluntary agreements on producers' responsibilities in reducing

emissions and effluent, providing environmental information to consumers and guaranteeing or facilitating product disposal through reuse, recovery and recycling.

33. Would changing the present production and consumption patterns through the use of the instruments outlined above affect economic growth, and if so, how? The problem was explored in a paper on long-run scenarios of growth, taking into account the "green" demands for a sustainable economy. The findings of the research suggested that while future production and consumption patterns would be very different from the conventional projections (without incorporating the "green" development demands), annual changes and adjustments would not appear any more dramatic than has been witnessed since the 1950s. The findings also suggested that there was substantial resilience in the economy to allow for gradual adjustment to new conditions for production and consumption.

34. In the subsequent discussion on policy options and instruments, participants further reviewed the strengths and weaknesses of the various instruments. While the analyses of the use of individual instruments in country-specific contexts were considered sound, some participants cautioned against over-reliance on one single instrument that could prejudice the use of others and the enhanced impact of a combination of instruments in the light of specific conditions. It was further pointed out that use of the appropriate mix of instruments could be integrated into ongoing structural adjustment programs, and be used in conjunction with the phasing-out of subsidies that work against sustainable consumption and production patterns.

35. On the issue of the cost-effectiveness of innovative measures, participants felt that both cost-reduction and great synergy could be achieved if existing mechanisms and facilities could be used, such as incorporating consumption patterns into conventional household expenditure surveys.

36. In evaluating the distinct features of the policy instruments under discussion, it was suggested that despite the recent tendency to move away from command-and-control to economic instruments, some inherent problems associated with the latter should not be underestimated. For instance, economic instruments tended to be adopted only when significant damage to ecosystems had already occurred. Furthermore, the lack of response to some taxes and charges because of the low level at which they had been set also indicated that considerable difficulties existed in resource pricing. In the absence of a market in environmental resources, such difficulties were likely to remain.

37. Turning to the international level, some participants expressed the concern that developing countries had been mainly left outside the studies on the various instruments, although their application should be relevant under many circumstances. Of significance was the lack of resources in developing countries to collect basic data and information that underpinned the design of policy instruments and the urgent need for external support in this undertaking. It was further pointed out that given the globalization of environment problems, innovative instruments could also be applied in the global context, such as pooling of

emission rights based on the sink functions of the global commons, a concept relevant to the recent emphasis on environmental space, eco-footprints and eco-efficiency.

## IV. TARGETING THE SPECIFIC POLICY AREAS

38. At its third session, the Workshop examined the experiences of various countries in applying policy measures to specific practical sectors and lessons learned from the experiences. Four specific areas of consumption were discussed:

### A. End-use energy consumption

39. The Chinese experience in energy consumption focused around the high dependency of the Chinese energy structure on coal. It was noted that coal was a major local resource that accounted for 76% of primary energy consumption and 51% of end-use energy consumption. Coal was also expected to remain a major energy source for many years to come.

40. In dealing with the environmental implications of this, China plans to improve its energy structure by constructing hydropower and nuclear power plants, as well as by strengthening the management of coal-fired thermal power stations through reducing coal consumption per unit of output, reducing polluting emissions, and improving or replacing existing power plants in more than thirty major cities.

41. In discussion, concern was expressed that energy pricing policies were, in many cases, largely influenced by the fear of inflation, even though there seemed to be a strong consensus that energy subsidies should be removed. Many participants at the workshop agreed that continued energy subsidies would encourage inefficiency in the allocation of resources. It was also pointed out that the current estimates of coal reserves were somewhat misleading. The usable reserve would be only 25-30% of the known estimate, and thus planners must be cautious when making long-term policy decisions.

42. The U.S. experience was addressed next, where it was emphasized that the following factors were crucial for changing end-use energy consumption patterns:

43. Policy interventions must work with market forces, and as consumer preference was a critical aspect of the success of policies to change consumption patterns, it was important to change consumers' behaviour at a fundamental level. This could be achieved through education and the dissemination of information to the public about the importance of and ways to conserve energy, and hence relieve pressure on the environment and natural resources. The role of grassroots movements and NGOs was particularly important in this regard.

44. In its role as a major consumer, government can contribute to the acceleration of changing consumption patterns by moving faster towards adopting more environmentally friendly and sustainable energy consumption patterns. To expedite this process, sharing experience of policies and seeking common goals amongst governments through international cooperation was vital to the success of such efforts.

45. During the discussion on this topic, some participants encouraged greater effort from developed countries, particularly the USA, in reducing greenhouse gas and other emissions. It was noted that this was indeed the goal of the USA for domestic reasons, as well as to meet its responsibilities toward the global commons. It was also pointed out that due to the rapidly growing share of energy consumption of developing countries, it would not be long before the greenhouse gas emissions from developing countries exceeded that of developed countries.

46. Transferring environmentally sound technologies from developed to developing countries was recognized as an important means to reduce total emissions. Sharing costs and benefits through international cooperation, for instance under a joint implementation program, could also be effective in achieving this common goal.

## B. Waste Management

47. In this session, two case studies in waste management were presented: the German and Korean experiences. In one sense, the two countries dealt with the waste management challenge very differently, but there were also similarities.

48. The main feature of the German approach was the use of ordinances, or laws, that assign the duty of minimizing waste generation by measures of waste avoidance and waste recovery to industry and retailers. The best known of these ordinances is the Packaging Ordinance of 1998 which obliged producers and distributors to take care of the recycling of used packaging outside the general waste management system. By implementing these ordinances, the Federal German Government is trying to implement a kind of "product responsibility" which covers the responsibility of a product, not only before, but also after its use.

49. As its principal tool for controlling waste generation, the Korean government launched a policy of volume-based fees for waste disposal in January 1995. This new waste-collection fee system was designed to provide households and firms with a strong economic incentive to reduce waste generation. Percentage reductions in waste collection following implementation of this system have been significant (more than a third), yet are not considered successful enough to achieve sustainable consumption. Real success can be achieved only by complementing this new fee-based policy with other policy measures.

50. Both the German and Korean approaches are similar in that price instruments are used in order to create positive incentive for economic actors to take the environment into account in their decisions. German consumers pay for the packaging material when they purchase a product; in Korea, households and businesses pay for waste disposal based on the volume of the waste they produce.

51. One common lesson to be learned from these two countries' experiences is that a well designed policy mix is the key to success. As the Korean Government realized during the implementation of their volume-based fee policy, price instruments alone cannot do the job. Public acceptance and the availability of the proper facilities and infrastructure are equally important. Both studies showed that complementary facilities lagging behind the implementation of policies undermine the effectiveness of incentive mechanisms and can even threaten (as in the case of Germany) the acceptance of the policies concerned. In both cases, the need for sufficient recycling capacity was mentioned. Korea also feels a need to build incineration plants in order to decrease the percentage of waste (currently 90%) going to landfill.

52. A second common lesson to be learned from these two countries is that both timely and extensive research on technical issues and consumer response are needed, preferably prior to the implementation of policies. In Germany, it would have helped to know somewhat earlier in the process that the German consumer would like separating and sorting so much. In Korea, it would have helped to have foreseen and prevented the problem of plastic bags which, not being naturally decomposable, has created a new threat to the environment.

53. During the Workshop discussions of the topic, concern was expressed about the possible negative repercussions of the suggested policies. It was noted that while the German policy had been effective in reducing waste generation, it may also have resulted in denial of market access for, particularly, less developed countries. It was also noted that increasing incineration capacity, one of the proposed solutions, might run counter to recycling goals and could even contribute to other problems, such as disposed toxic sludge and incineration ash disposal, as well as air pollution.

## C. Consumptive use of water resources

54. Three presentations, from Australia, France, and the perspective of the UN Environment Programme, emphasized that water is a scarce world resource which should not be regarded as a "free commodity", but rather as an economic good with a real price-tag attached. Increased per capita consumption and population growth was resulting in an increasingly unsustainable use of this precious resource.

55. Expansion in irrigation, among other things, has been a significant factor contributing to pressure on the water supply. It was suggested that around 70% of the world's total use

of water is consumed, by irrigation for agricultural purposes. Therefore, the key to successful water management, and thus progress toward the sustainable use of water, lies in the careful management of the agricultural demand for irrigated water.

56. It was proposed, based on the Australian experience, that capacity sharing and keeping detailed water accounts might be an effective way of distributing limited water resources when there were a small number of allocation holders. Capacity sharing, a cap on total diversions, with well defined water property rights would increase the efficiency of water allocation. Pricing and labelling policies were also important in relation to consumers. It was also noted that the principles of integrated catchment management should be explored for the success of achieving sustainable use of both land and water. Strong and consistent leadership from government, supportive rural adjustment and social policies, and community participation were crucial in this regard.

57. The French experience led to the conclusion that the full application of the "Polluter-pays Principle" on water effluent charges could be used effectively to change the current water consumption pattern. It was also suggested that empowerment of local authorities could promote efficient allocation and management of water resources.

58. From the perspective of the UN Environment Programme, a progressive rate structure of water prices was regarded as possibly the most effective tool to achieve the sustainable use of water. Marginal cost of water that increases with quantities would effectively discourage excessive consumption of water while ensuring affordable access to water for basic needs. Subsidies on water consumption should be removed, whenever possible, since they distorted the price structure of water

59. It was also pointed out that modern technologies could provide much more efficient equipment in many applications of water. Policy should provide means of installing those technologies and also induce further research in water saving appliances. Regulations requiring minimum standards for devices and appliances could help to reduce waste.

60. All three presentations strongly emphasized that the proper pricing of water was the single most important policy for sustainable management of the water resource. Prices must account for the full costs of supplying and preserving the quality of water and maintaining the resource base. This includes capital, operating, social and environmental costs. Efforts must be made to value environmental and social costs in monetary terms which should reflect people's preferences and willingness to pay.

61. During the discussion on this topic, a suggestion was made to use intermediaries (real estate agents for example) to raise pubic awareness on this issue and other consumption issues like energy. It was also noted that accelerated dissemination of information on new environmentally friendly technologies (such as water saving shower heads and toilets for example) could promote movement toward sustainable patterns of water use.

62. The Workshop participants acknowledged that real tensions can and do exist where two or more countries share common water resources. The control of a river by one country resulted, in many cases, in the loss of agricultural and other types of water use in neighboring countries that share the same river system. It was suggested that a proper capacity sharing system needs to be established, even though this might take a long time.

## D. Urban/land-use planning

63. In the final sector-specific topic in this session of the Workshop, there were four presentations, from Canada, India, Indonesia, and the United Kingdom. All the presentations agreed that the inefficient use of land and un-coordinated urbanization could jeopardize the sustainability of the earth.

64. The research originating in Canada suggested that reducing the "ecological footprint" of consumption was essential for achieving sustainable consumption of resources. To achieve this goal, it was stressed that there was a need for tax reform implemented jointly with the removal of subsidies to technologies that created a large ecological footprint. Revenue from ecological taxes should also be invested, at least in part, in rebuilding natural capital stocks.

65. The need for a fundamental changes in the way human beings sustained their lifestyle was also emphasized. Ways of fulfilling peoples needs have to be changed dramatically. In this regard, the goal of sustainability would be better served by investing in social capital rather than in innovations in technology.

66. Both Indian and Indonesian experiences in urban/land-use management yielded a common lesson, that urban/land use problems in many places have been exacerbated by inefficiencies in the urban land market and by private sector development occurring in an uncoordinated fashion. Urban/land use planning must, therefore, be sufficiently attuned to the geographical variations of development and local environmental conditions if they are to efficiently address the challenges that lie ahead.

67. In facing these challenges, the effectiveness of such planning can be improved by (i) increasing the relevance of urban/land use plans by linking proposals for land use with economic and social development and environmental management proposals; (ii) evolving development portfolios on the basis of carrying capacity and conserving bio-diversity and plant genetic resources; (iii) adopting preventive rather than curative strategies; and (iv) preparing and disseminating guidelines and a manual for urban spatial use management. The British experience yielded a lesson that every effort must be made to ensure transparency of policy by encouraging public involvement in the planning process from the very beginning.

68. In the ensuing discussion on this topic, it was urged that close attention must be given to future trends in transportation needs. Concern was also voiced about the possible drawbacks of a transition toward denser cities through urbanization. In response to this

concern, it was noted that density itself should not be a problem since dense cities with good transport systems would have the smallest ecological footprint. The way in which urbanization could result in the drainage of funds from rural sector, as a result of migration toward cities, was also expressed. This would result in the lack of funds to manage the rural environment.

## V. SHARING RESPONSIBILITY TOWARD THE SUSTAINABLE GOAL

69. The final substantive session of the workshop examined the respective roles which the business community, Governments, non-governmental organizations (NGOs), and individual citizens could most effectively play in helping to move toward the goal of more sustainable consumption.

70. The global business community, or at least leading international corporations, have for some years recognized the challenge and opportunity presented by the need to minimize energy and raw material use and wastes production, whilst remaining competitive. The goal of the World Business Council for Sustainable Development (WBCSD) in undertaking a work programme on sustainable consumption and production is to help extend the message of "doing more with less" both horizontally- by spreading sustainable production practices to an increasingly large group of industries and service sectors - and vertically - by infusing sustainable practices into the full range of a firm's activities.

71. The WBCSD's three-part work programme was focused on: (i) the definition and boundaries of the subject; (ii) how to move from cases to models of sustainable practice, and at the same time identify barriers faced by business; and (iii) developing Recommendations for Governments and business on how sustainable practices can best be widely and successfully adopted. Recent activities have included Expert Workshops on "Product Life Optimization" (Boston, USA, July 1995) and on the "Role of Environment in Advertising and Marketing"(Oslo, Norway, August 1995). These meetings provided valuable insights into how companies were already moving forward in areas such as enhanced service benefit, design for upgrade, leasing, remanufacturing, and disassembly. Advertising and marketing techniques used by companies frequently utilize the environment either to enhance corporate image, or as a specific selling point. The business community needed to use such techniques responsibly to influence consumer behaviour and preferably to encourage more, rather than less, sustainable patterns of consumption, by educating consumers rather than aiming solely to increase market share.

72. Technological innovation, cultural and behavioral change and new policy approaches were needed to advance current industrial practice, as well as to modify consumption patterns. Some of the major opportunities and challenges faced by business were product life optimization, the role of business as an agent for change in the markets, where its influence as both a supplier and customer was crucial, and the relationship between industry practices

and public policy. The question of which performance indicators needed to be developed or utilized at both firm and national/international levels, in order to help industry move towards more sustainable production and consumption, was also an important one to address.

73. Turning next to the role of Government, particularly in its role as a major consumer, the workshop heard about the Japanese Government's "Action Plan for Greening Government Operations", approved in June 1995 within the framework of the Japanese Basic Environment Law and Basic Environment Plan. This initiative was seen as consistent with the priority already being given to this issue in other countries of the "G7" (the seven most advanced industrialized economies), such as Canada and the UK. It was also designed to make a significant contribution to moving Japan towards a more sustainable pattern of consumption. The Government of Japan was the biggest single consumer in the national economy, responsible for 2.2% of Japanese GDP in 1993.

74. The Action Plan was comprehensive in its coverage, applying to all (central) Government Ministries and Agencies and to all Governmental activities affecting the environment. It also included 37 specific targets, of which 11 were quantitative. The issues embraced by the Plan were:

(a) Purchase and use of goods and services;
the construction and maintenance of buildings;
(b) Administrative activities (such as energy and water use in offices, use of vehicles, recycling, pollution prevention);
(c) Training programmes for Government officials (to raise awareness and encourage action); and,
(d) Development of an effective mechanism for implementation and review of the plan.

75. The decision to develop a plan of this kind reflected the recognition in Japan that, at present, there was inadequate cooperation on environmental issues between Government Agencies, especially on the "greening" of their own activities and, second, that the daily office life of Government officials was not currently an environmentally friendly one. Two key messages were important to convey from this workshop to national Governments: the need to establish Action Plans as a strategic policy measure, and the vital need for a sharing of information and experience amongst national governments, as well as between Government and other sectors.

76. The role of consumers, other non-governmental organizations (NGOs), and individual citizens was examined next, in a paper on the Indian experience in this field. This noted that NGOs, from small community groups to large organizations, have several important attributes which made them crucial actors in the move towards more sustainable consumption: credibility among local people because of their independence; being composed of individuals committed to organized social action; and the ability to reach many

constituencies with their messages and to involve them in the design and implementation of projects.

77. NGOs were thus equipped for campaigning, to press for national and international policy changes towards sustainability, and for encouraging individuals to take personal responsibility for changing their consumption patterns and those of their communities. To this end, the consumer movement has an important role to play in the area of sustainable consumption. Consumers International, a federation of 205 consumer organizations in over 80 countries, has been active in recent international discussions on how to achieve more sustainable consumption and production patterns. The organization espoused four basic ways for consumer organizations to promote the goal of sustainable consumption: by educating and informing consumers about the environmental impact of their choices and pointing them towards environmentally sounder product selections and lifestyle choices by including regular and thorough environmental assessment of products and services in comparative testing and surveys; by advocating the consumer interest in public policy debates; and, by advocating high environmental standards of performance for products regardless of whether the products were domestically made or imported.

78. Many examples already existed of national consumer organizations taking action to promote more sustainable consumption: the Consumers Union of the US project on assessing the environmental impact of cars; the Dutch organization Consumentenbond testing the recyclability of TV sets; and the Korean Citizens Alliance for the Protection of Consumers (CACPK)'s ambitious programme on energy reduction, which included consumer education

79. It was important that Governments still played the leading role in moving societies towards sustainable development in general and sustainable consumption in particular. But at the same time, NGOs should be willing to shoulder certain responsibilities and duties.

80. In the ensuing discussion, some of participants stressed that, while business and NGOs seemed to be on the right track, a major concern existed on the role of Governments as consumers. The importance of developing plans for action at the appropriate administrative level was also emphasized. In Thailand, for instance several local-level action plans for more sustainable resource use had failed, and were now being developed at the provincial-government level, involving a wide range of stakeholders. But more generally it was seen as essential that conflicts or inconsistencies in Government policies which contributed to over-consumption should be avoided, for instance subsidies which harmed the environment. There was also a real need to evaluate consistently and comprehensively the potential economic and social consequences of policy measures proposed for changing consumption patterns.

81. Participants also stressed the importance of encouraging small and medium-sized enterprises to work towards more sustainable consumption and production patterns and highlighted the value of large companies using their supply chains to help to achieve this. It

was suggested that business also had a responsibility to participate more actively in eco-labelling schemes.

82. In conclusion, in was generally accepted that, while Governments, the business community and NGOs each have distinctive roles to play (which would vary between countries at different stages of development), a basic level of agreement on the overall trajectories needed to move societies towards more sustainable consumption patterns and how the different sectors of society should work in partnership to this end, was essential. Such partnerships therefore needed to be strongly encouraged.

## VI. CHAIRMAN'S CONCLUSIONS

83. The Government of the Republic of Korea, in collaboration with the Government of Australia, the UN Department for Policy Co-ordination and Sustainable Development, United Nations Development Programme and the Organisation for Economic Co-operation and Development, hosted an international workshop on Policy Measures for Changing Consumption Patterns in Seoul, Korea from 30 August to I September 1995.

84. The workshop was designed to contribute to the international work program of the UN Commission on Sustainable Development agreed to at its third session in April 1995. It built upon a number of earlier events, notably the Oslo Round Tables on Sustainable Production and Consumption (Norway, Janusy 1994 and February 1995), the OECD Experts Seminar at MIT (USA, December 1994), the Workshop on Facilities for a Sustainable Household (The Netherlands, January 1995), and the OECD Workshop on "Clarifying the Concepts" (Norway, July 1995).

85. After a series of introductory presentations from national governments and the UNCSD on Setting the Sustainable Consumption Agenda, the workshop examined policy options and instruments based on case studies of their application in a number of specific policy sectors:

(a) End-use energy consumption;
(b) Waste management;
(c) Use of water resources;
(d) Urban/land use planning.

86. The following conclusions are those which the Chairman, the Assistant Minister of Environment of Korea, Dr. Chin-Seung CHUNG, considers could best illuminate future work on changing consumption patterns by national governments, the UNCSD, and other international organizations.

## A. Common themes

87. Recognizing that prevailing patterns of production and consumption are a primary cause of detrimental local and global environmental change, and based on the Workshop discussions with a sector-specific focus, a number of common themes emerged:

(a) An appropriate mix of instruments which can include regulatory, social and economic instruments (including subsidy removal and ecological tax reform) are needed in each sector, together with complementary policies.

(b) Movement towards proper pricing for the use of natural resources, and removal of subsidies, will assist in the achievement of more sustainable patterns of consumption.

(c) Government regulations that are designed to facilitate product and process innovation can accelerate the diffusion of ecoefficiency.

(d) Education on environmentally responsible consumption helps to create an appropriate climate for change; it should embrace technical and management skills as well as schooling.

(e) Government policy objectives should be clear, consistent and coherent.

(f) Institutions responsible for policy development, natural resource management, and operational activities should each have clearly defined functions and an appropriate system of accountability.

(g) Because of the extensive infrastructure already in place in major economic sectors such as energy, transportation, freshwater, and wastewater as well as the need to resolve conflicts among stakeholders, changing resource use patterns through the implementation of new policies may take considerable time.

(h) Decentralization of responsibilities for sustainable resource management, where appropriate, increases the effectiveness of many policies.

(i) Partnerships among government agencies, private sector firms, voluntary organizations, and individual communities should be encouraged.

(j) Human resources development and institutional capacity building are needed to support sector-specific policy implementation.

(k) The principle of extended producer responsibility, in the light of life-cycle analysis, could usefully underpin specific policy measures in materials

extraction, product design, product information, waste management, and energy efficiency programs.

(l) Increasing understanding among different stakeholders as to the dimensions of problems and their possible solutions can be facilitated by the use of multisector simulation models.

(m) International cooperation in sharing experiences with the use of policy instruments and in facilitating the transfer of finance and technology will accelerate the process of changing to more sustainable consumption and production patterns.

(n) Resource distribution patterns locally, nationally, and globally need to be equitable if they are to be sustainable.

## B. Sector-specific themes

88. In the light of case studies of specific fields discussed during the Workshop, a number of sector-specific themes emerged as important for the success of policies to achieve more sustainable consumption patterns. These were:

End-use energy consumption

(a) Policy interventions must help to remedy the limitations of market forces. Broader application of full-social-cost pricing for energy services (in order to better reflect environmental impacts), and utilization of the free market to meet energy service demands, can contribute to the achievement of more sustainable energy consumption patterns.

(b) Changing consumer preferences is critical for the success of policies to influence consumption patterns. This points to the importance of information and education campaigns, and a critical role for grass roots and NGO efforts.

(c) Policies to change energy consumption patterns must address both personal behaviour (which creates a demand for energy services) and the technology characteristics of that energy service, including its structure of production.

(d) A long-term focus on technology development and diffusion is required to ensure that technologies are available which minimize environmental impact whilst facilitating sustained economic growth.

Waste management

(a) The primary goal of waste management is to minimize the production of waste. The implementation of regulations, economic instruments and voluntary agreements directed at producers and distributors can each help to avoid waste generation and promote waste reuse and waste recycling.

(b) The life cycle approach applied to waste management needs to be promoted by various voluntary, regulatory, or economic measures, accompanied by the building of adequate facilities and public awareness campaigns.

(c) The gap between responsibility for the production and distribution of goods on the one hand, and the management of consumer waste on the other, can be narrowed by implementing "extended producer responsibility". This can ensure that producers and distributors of products have to participate in product recycling, and is also a useful way of changing consumer perceptions.

(d) Effective pricing policies can result in better waste management, especially reduced waste volumes, as in the case of the Korean Volume-Based Waste Fee System.

Consumptive use of fresh water resources

(a) Proper pricing of water, for all users, is crucial; over time prices charged must account for the full costs of supplying and preserving the quality of water and maintaining the resource base, as well as its scarcity. This includes capital, operating, social and environmental costs.

(b) Integrated watershed management approaches can be very effective in managing water resources as a unique entity, and achieving more sustainable management of irrigation systems, particularly if accompanied by rural adjustment policies that transfer water to more productive use and ensure long term profitability for farmers and other water users.

(c) Effective and equitable water allocation policies are important for shared river systems. Worthwhile approaches can include capacity sharing, capped diversions and the establishment of water markets and trading.

(d) Information and education efforts that explain the value of and methods for conserving water are needed at all levels of society and for all types of water consumers. There is a need to change consumer perceptions of water as a resource and thus to reinforce the benefits of water pricing and adoption of new technologies.

Urban/land use planning

(a) Land use is an important form of consumption. An efficient and responsive land use planning system, which balances the interests of the individual and society, is essential for sustainable development. It should allow the public to be involved in order to ensure transparency of decision-making.

(b) Urban land use planning policies must be sufficiently attuned to specific local environmental conditions and development considerations.

(c) The relevance of urban land use plans is increased by linking proposals for land use with economic and social development and environmental management.

(d) Guidelines and manuals for urban land use management which include guidance on potential implications for consumption patterns should be developed and disseminated.

(e) In designing urban planning and development policy, governments should recognize that the sustainability of urban economies and population is increasingly dependent on the sound management of land resources far beyond the boundaries of cities per se, often in other countries. The "ecological footprints" of industrial cities are typically one to two orders of magnitude larger than their political or geographic boundaries.

## C. The responsibilities of various actors

89. Recognizing the many and varied roles of government, business and NGOs in influencing consumption patterns, the Workshop discussions led to the emergence of the following conclusions:

Role of Government

(a) Conflicts or inconsistencies in government policies that contribute to overconsumption should be removed or avoided (e.g subsidies which harm the environment).

(b) The range of economic and social consequences of policy measures proposed to effect changes in consumption patterns should be consistently and comprehensively evaluated (e.g. trade, investment, competitiveness, employment).

(c) Governments should establish comprehensive action plans for the "greening" of their operations, including the setting of quantitative targets to change their consumption patterns.

(d) Such a governmental action plan could cover:

i. The procurement of goods and services;

ii. Construction and maintenance of buildings;

iii. Administrative activities effective training of Government officials;

iv. Mechanisms for review.

(e) Local government, other public sector organizations and intergovernmental organizations should also consider developing plans for "greening" their operations. Governments can actively encourage them to do this.

(f) There is an urgent need for Governments to share information and experience in this field amongst themselves as well as with other groups in society, including NGOs.

Role of Business

(a) Business has a leading role to play in shaping more sustainable patterns of consumption, by acting as an agent of change in the market, and by virtue of its role as a major consumer of goods and services.

(b) Technological innovation and product life optimization, when pursued by business, are a means of increasing competitiveness whilst reducing environmental impact.

(c) Marketing and advertising techniques when applied by business can encourage more sustainable patterns of consumption.

Roles of NGOs and Citizens

(a) Consumer organizations and other NGOs have an important role to play in undertaking innovative initiatives for changing consumption patterns,and can also support efforts by governments and business to:

i. Design and promote environmental policies, keeping in mind the views and well-being of individual consumers/citizens;

ii. Internalize environmental costs whilst taking care to protect those members of society least able to bear the burden;

iii. Promote (1) the dissemination of reliable environmental information; (2) the sound environmental labelling of products; (3) reliable environmental claims and symbols; and (4) implementation of policies for recycling and separate waste collection when needed

(b) NGOs can in addition encourage:

i. Consumer awareness and action to change consumption patterns and thus the production of less environmentally harmful products;

ii. An environmentally friendly ethos in society, as well as discouraging perceptions and patterns which degrade the environment;

iii. Effective waste prevention programs aiming at reducing the quantity of materials used in products and packaging; unavoidable wastes should be capable of re-use or recycling; efforts to reinvent and redefine concepts of "civil society" by helping individuals join the decision-making processes and give expression to social values, many of which are not captured by the market;

iv. The entire population, including major groups such as women, youth, and children, and those groups whose participation in market processes is most fragile, to help develop and promote visions of a sustainable society.

(c) Workshop participants strongly encouraged citizens to take the environment into account in their day-to-day decisions, a process which should gradually become easier and more automatic if governments, business, and other actors in society implement the policy measures described above.

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Item 4 of the provisional agenda*

# FINANCIAL RESOURCES AND MECHANISMS

## Note verbale dated 1 March 1996 from the Permanent Representative of Japan to the United Nations addressed to the Secretary-General

The Permanent Representative of Japan to the United Nations presents his compliments to the Secretary-General of the United Nations and, with reference to the forthcoming fourth session of the Commission on Sustainable Development to be held from 18 April to 3 May 1996, has the honour to transmit the Chairman's Summary of the Third Expert Group Meeting on Financial Issues of Agenda 21 held at the Asian Development Bank, Manila, Philippines, 6-8 February 1996, under the co-sponsorship of the Governments of Japan and the Philippines, the Asian Development Bank, and the United Nations Department for Policy Coordination and Sustainable Development.

This was the third in a series of expert group meetings, the first and second of which were held in Kuala Lumpur, 2-4 February 1995, and Glen Cove, New York, 15-17 February 1995. Its purpose was to discuss current financing mechanisms for implementing Agenda 21 and to make recommendations for action for submission to the inter-sessional Ad Hoc working Group on finance and consumption and production patterns of the Commission, to be convened 4-8 March 1996, and to the Commission itself, at its fourth session, to be held 18 April-3 May 1996.

It would be greatly appreciated if arrangements could be made to circulate the attached Chairman's Summary as an official document of the Commission on Sustainable Development at its fourth session under item 4 of the provisional agenda.

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* E/CN.17/1996/1, to be issued.

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Annex

# THIRD EXPERT GROUP MEETING ON FINANCIAL ISSUES OF AGENDA 21

## CHAIRMAN'S SUMMARY

## OVERVIEW

1. The third expert group meeting on financial issues of Agenda 21, sponsored by the Governments of Japan and the Philippines, the Asian Development Bank (ADB) and the United Nations Department for Policy Coordination and Sustainable Development (UN/DPCSD), took place at the Asian Development Bank Headquarters in Manila, Philippines on February 6-8, 1996. The goal of the meeting was to provide the Ad Hoc Intersessional Working Group on Finance and Consumption and Production Patterns of the United Nations Commission on Sustainable Development (CSD) with expert advice on the most promising means of attaining the domestic and external financing requirements of Agenda 21. An additional aim was to provide useful information for preparatory activities of the Special Session for the General Assembly in 1997, which will evaluate progress toward the objectives of Agenda 21.

2. The meeting was attended by sixty-nine experts from governments, international organizations, research institutions, nongovernmental organizations (NGOs), and the private sector. Countries in Asia and the Pacific were the most heavily represented, leading to more emphasis on issues and opportunities in that region, but it was noted that the need for higher levels of finance, and the existence of relevant experience in stimulating financial flows, is not unique to the region. The experts attended in their personal capacities, not as official representatives of their organizations. The meeting was chaired, as on previous occasions, by Dr. Lin See-Yan of Malaysia. The agenda of the meeting and the list of participants are attached.

3. The experts' discussion covered a wide range of topics under the general headings of:

(i) promoting private sector investment in sustainable development

(ii) environmental funds

(iii) implementing environmentally friendly economic instruments

(iv) financing technology transfer

(v) innovative international financial mechanisms

(vi) matrix of policy options and financial instruments

4. This report does not attempt to reflect all the views and suggestions made, nor does it represent a negotiated text. It reflects, nevertheless, the general thrust of the deliberations. Participants agree that it provides a substantive contribution to future discussions in the Ad Hoc Working Group of the CSD and the fourth session of the CSD.

5. Eight points of broad agreement emerged from the meeting:

(I) Financing sustainable development goes beyond the financing of environmental protection and management. It involves the integration of social, economic, and environmental aspects of development.

(ii) Clear, credible, and stable macroeconomic, sectoral, and environmental policies at the national level provide the fundamental basis for mobilizing, and sustaining, domestic and international financial resources for sustainable development.

(iii) The preferred financial instruments are ones that not only raise revenue but simultaneously change production and consumption patterns in ways that promote sustainability. Nevertheless, in practice, there will always be a need for residual financing generated by more general instruments.

(iv) The bulk of financial resources will have to come from, and be invested by, the private sector, including the nonprofit sector. Policies must increasingly shift toward economic instruments to stimulate dynamic private sector involvement on both the supply and demand sides of environmental investments.

(v) Despite the increasingly dominant role of the private sector, official development assistance (ODA) will continue to be a necessary ingredient for sustainable development, especially in the least developed countries.

(vi) To be most effective, available funds from government contributions, ODA, and multilateral financial institutions should promote private sector participation and leverage private capital flows by overcoming market imperfections and other barriers to those flows.

(vii) By engaging the market, a combination of incentive-based policies and targeted technical assistance efforts can simultaneously mobilize financial resources, stimulate technological transfer and innovation, and shift production and consumption toward more sustainable patterns.

(viii) Considerable experience and ongoing experimentation with incentive-based financial mechanisms exist in industrialized and developing countries and economies in transition. There is an urgent need to compile and communicate this information more effectively, especially to policymakers and the public, and to enhance national capacities to identify, develop, and implement appropriate incentive-based policies.

# I. PROMOTING PRIVATE SECTOR INVESTMENT IN SUSTAINABLE DEVELOPMENT

6. Official development assistance (ODA) does not appear likely to increase significantly in the near future. Even if it does, its contribution will not be sufficient to meet the external financing needs of Agenda 21. In contrast, private capital flows to developing countries have grown relative to ODA and in absolute terms in recent years. To date, however, these flows have been mostly to a relatively small number of developing countries. There has been little attempt to determine their impact, positive or negative, on national sustainable development financing needs. While international flows have attracted the most attention, the impact of domestic flows should also be analyzed, as they too are a substantial and in many countries dominant source of investment capital. There is therefore growing international interest in analyzing the impact of private capital flows on sustainable development goals, and in identifying and implementing policies and economic incentives to increase and sustain the flow of private capital to support these goals.

7. Expert presentations and discussions on private sector finance identified key obstacles to private investment in environmentally, socially, and economically sustainable projects and programs. In particular cases, obstacles may include some or all of the following: low and inconsistent demand for environmental technologies and services, market and policy risks, limited technical or financial intermediation capacity, a limited menu of financial instruments, information gaps, and/or limited access to technology. At the most basic level, policies and programs must be designed to enable private actors to make potentially profitable investments in sustainable technologies and services at an acceptable level of risk. This requires at least three types of actions.

8. First, governments must provide sound, and predictable, macroeconomic and environmental policy frameworks. Macroeconomic uncertainty and instability, as well as cumbersome procedures for approving foreign investment applications, affect environmental investments as much or more than other investments. Clear, credible, and stable regulations (including economic instruments) for environmental quality and natural resource use, based on broad public consensus and effectively enforced, are essential for stimulating private-sector demand for environmental and natural resource management technologies and services. By setting nationally appropriate environmental objectives, removing policy distortions, and inducing industry to make environmentally friendly production and investment decisions, countries can reduce sustainable development's financing needs.

9. Second, governments and international agencies can undertake specific measures to reduce the market risks, policy risks, and transaction costs associated with investments in environmentally friendly goods and services, including for example waste management, "clean" process technologies, ecotourism and "green" products. Many of these measures can generate

substantial leverage of ODA and other international and domestic public funds. For example, recent experience in Chile indicates that governments can use contract bidding for the provision of waste management services and environmental infrastructure to specify public and private responsibilities and performance requirements, thereby reducing uncertainty about investment opportunities, risks, and returns. Other recent examples come from several Indian states and Central America, where experience in renewable energy investment demonstrates that the lack of national financial and technical intermediaries for small-scale energy projects can be overcome by a phased investment program combining policy reform, technical and contract assistance, demonstration projects, and management training. This points to the existence of opportunities for ODA and other forms of public capital to be used to leverage much greater financial resources. Modest capital investments in e.g. revolving funds for preinvestment studies (with cost recovery from deals that reach closure), lines of credit and other forms of financial intermediation can help overcome the lack of information, risk perceptions, and transaction costs that discourage private investment in environmental projects, particularly small and medium sized projects.

10. Third, at the sectoral and firm levels, national and international agencies can provide information, training, clearinghouse services and marketing assistance (e.g. support for domestic and export trade fairs) to assist the public and private sectors in identifying opportunities for private sector finance and sales. For example, Hong Kong has vast experience in BOO, Build-Operate-Transfer (BOT), and other arrangements for financing a range of infrastructure projects, but its experience is poorly documented and communicated. A different example comes from Sri Lanka, where institutional dialogues have brought together public environmental, industry and finance agencies and private industry organizations to discuss innovative policy proposals (e.g. on deconcentrating industrial sites through joint investment in new industrial estates) and identify promising investment projects. Evidence suggests that these dialogues have stimulated a volume of private investment far in excess of the public resources needed to convene the participants.

11. Several issues require further study. First, more analysis is needed of specific product and service markets and their related capital markets at the national and regional levels. It is important to determine the particular barriers to private investment in order to develop strategies to overcome them, and to gain maximum leverage from public finance. Second, more analysis is needed to assess the potential of innovative supply-side financial instruments, such as "green" venture capital funds, and demand-side policies, such as ecolabelling, preferential duty, tax, and interest rate treatment for the import of environmentally friendly technologies, and the addition of environmental performance criteria to government procurement requirements.

## II. ENVIRONMENTAL FUNDS

12. During the past several years, a number of countries, particularly those undergoing the transition from central planning to a market-based economy, have strengthened or created public-sector pollution abatement funds (PAFs). PAFs' revenues come predominantly from charges and fines on polluting enterprises, and their expenditures subsidize enterprise and municipality investments in pollution control. During the same period, a number of developing countries (and some economies in transition) have created conservation trust funds (CTFs) to finance management of protected natural areas, particularly by NGOs and local communities. CTFs are typically set up as endowment funds, with financial resources coming predominantly from external multilateral, bilateral, and non-governmental donors. Recently there have also been several proposals for the establishment of a regional sustainable development fund in the Asia- Pacific region.

13. The rationale for PAFs stems from capital scarcity, weak pollution control regulation, and soft budget constraints for public enterprises. PAFs are second-best solutions to these weaknesses, but there is evidence that they have generated pollution control investments by enterprises and municipalities that would not otherwise have occurred. The major policy issues raised by PAFs are earmarking and capital subsidies. The earmarking of funds generated by pollution charges and fines for pollution control investments violates the polluter pays principle, may hinder sustainable development when the funds could have been invested in higher-yielding social activities (e.g. public health, education), and can potentially lead to a mismatch between investment needs and financial allocations even within the environmental sector. The use of capital subsidies to encourage enterprise investments in pollution control violates the polluter pays principle, may lead to overly capital-intensive approaches to pollution control, and may undermine the development of private capital markets. Due to these potential problems, PAFs are best viewed as second-best, temporary means of overcoming market, policy, and institutional failures that impede environmental investments. Nevertheless, if these problems are adequately managed, PAFs may be the best available option under some circumstances, particularly in transition economies.

14. CTFs are conceptually less problematic uses of public financial resources than PAFs, as they more clearly support the provision of public environmental goods. Experience with CTFs suggests that they can substantially increase the amount of money available for protection and management of natural areas in small countries and countries with very limited public budgetary resources, and can serve as a cost-effective means of delivering donor assistance to numerous small, local-level projects. Because they are usually multi-stakeholder institutions, they may also stimulate collaboration and innovation among groups whose previous interaction has been adversarial. Major concerns include CTFs' heavy reliance on external funding, the high transaction costs involved in establishing them, and their ability to earn adequate returns to attract nonconcessional finance. It appears that they have not fully exploited the willingness-to-pay of developing country publics and international tourists for protection services. In many

cases, they may be the most effective means of capturing this willingness-to-pay, as individuals may be reluctant to pay higher user fees if the revenue is not earmarked for protection of specific areas.

15. Recently, there has also been interest in establishing a regional sustainable development fund for Asia and the Pacific. It has been suggested that capital for such a fund could come from a variety of sources, including private funds leveraged by ODA, and that the fund could support the management of transboundary pollution and shared natural resources, protection of vulnerable ecosystems and remediation of past environmental damage, training and capacity building programs, and other regional priorities.

16. The proposal for the Asia-Pacific regional fund is in the initial stages. Discussion focused on the rationale for the fund (e.g., the presence of regional externalities, such as sulfur dioxide pollution or transboundary fisheries), the risk that it might divert aid resources from other activities (e.g. GEF), and the need for further consultation on its mandate and governance structure. It was proposed that other available funding mechanisms be fully exploited prior to establishing a new regional fund. It was also suggested that experience from other regional funds (e.g. UNEP's Regional Seas Programme) be evaluated to identify useful lessons.

## III. IMPLEMENTING ENVIRONMENTALLY FRIENDLY ECONOMIC INSTRUMENTS

17. Sustainable development requires full-cost pricing, which has three aspects: (i) reducing subsidies that are damaging to sustainable development, so that consumers and producers face at least the direct production costs of their decisions; (ii) raising charges on natural resources to levels that reflect depletion costs; and (iii) introducing pollution charges and related instruments (e.g., product charges and tradable permits) to force polluters to pay a price for the environmental degradation they cause. In addition to offering a large potential source of domestic revenue for sustainable development expenditures, these actions provide incentives for producers and consumers to shift their behavior toward more sustainable norms. The presentations and discussions addressed issues related to all three actions.

18. Some countries have made progress toward reducing environmentally damaging subsidies (e.g., ones on energy, water, pesticides, fertilizer), although often not until they are forced to do so by fiscal crises (e.g., in countries undergoing structural adjustment programs). Countries such as the Netherlands and New Zealand that have voluntarily and unilaterally reduced subsidies have apparently not suffered in the international marketplace, nor have countries such as Japan that have refrained from offering their industries and consumers subsidized energy. Even in cases where subsidies are designed to increase social equity, there appears to be substantial potential for cost savings through tighter targeting of subsidies to the

poor. The scope for further subsidy reductions remains enormous, with estimates ranging from hundreds of billions to a trillion dollars annually. Even if funds currently spent on subsidies are not directly rechannelled into sustainable development investments, their reduction will still reduce environmental damage, and thereby reduce the need for funds to finance remediation. Subsidy reduction will also generate funds for saving and investment by reducing deadweight losses in the economy.

19. Considerable scope also remains for countries to generate domestic financial resources by capturing more of the rents from natural resource exploitation. Rents are an attractive revenue source, because appropriately designed fiscal systems can tax rents without causing dead-weight losses. Rent capture is particularly low for timber, with performance in the minerals sectors being substantially better (although recent developments indicate that mineral sector rent capture may be falling due to increasing competition by governments for international private investment).

20. A number of OECD, transition, and developing countries have made significant progress toward implementing charges and tradable permits related to industrial pollution emissions and fuel and vehicle use. A few have even considered global environmental impacts in designing the charges (e.g., carbon-based energy taxes in Sweden and Norway). Although information on actual performance is limited, available research suggests that these economic instruments have generated economic and environmental benefits. The benefits have often been reduced, however, by the charges being set at too low levels or not being effectively enforced. Moreover, the ability of economic instruments to promote cost-effective pollution reduction - that is, to achieve environmental quality objectives at the lowest possible cost to industry - is often constrained by excessive associated regulations.

21. Further progress along all three lines depends greatly on issues of distributional impacts, international competitiveness, and other issues that affect political acceptability. There was broad agreement on the need to move beyond general and theoretical arguments in favor of subsidy reduction and cost internalization toward the development of practical strategies for educating policy makers, business leaders, and the public of the benefits of these policy reforms. Most important, the group agreed on the need to develop a body of nontechnical findings and recommendations based on actual use of instruments in a variety of sectors and national settings. In the longer term, it may be useful to develop "environmental economic literacy" programs for government agencies, businesses, and the general public. There was a suggestion that ultimately, further progress may require voluntary, multilateral consultations among interested governments (as discussed at the Second Expert Group meeting) to enable countries to coordinate their actions and thus reduce the risk of negative impacts on competitiveness.

22. The group also discussed the costs and benefits of phasing the introduction of full-cost

pricing policies to reduce "adjustment shock." Phased, gradual implementation may increase political feasibility, but it may also increase policy uncertainty due to change of government, and it may delay action in ways that result in higher overall adjustment costs.

23. There was also discussion of the tradeoffs involved in earmarking public revenues from environmental charges for environmental purposes. Earmarking can increase political feasibility, but it may not be the most efficient use of funds for either general social welfare purposes or for environmental improvement, particularly when there is no direct link between payment and environmental service provided. (When this link occurs, the payment is in effect a user fee, as in the case of direct charges for wastewater treatment or entry fees for parks). Earmarking also closes off the option of using environmental revenue to shift the overall tax base away from "goods" (e.g., income) toward "bads" and, in the case of pollution, undermines full-cost pricing (as the charge is what polluters owe to society for use of the environment after they have made abatement investments). In the case of natural resources, full earmarking of revenue from rents can be expected to lead to excessive investment in resource management. While earmarking is generally to be avoided, it is justified if it is the only feasible option for assuring the financing of economically and socially justified environmental expenditures.

## IV. FINANCING TECHNOLOGY TRANSFER

24. International interest in financing technology transfer for sustainable development has focused on three issues: first, using limited public resources to leverage private sector investment in environmental technology; second, encouraging the development and transfer of industrial process technologies that increase efficiency in input use and reduce the production of waste products (shifting the focus from end-of-pipe pollution control to pollution prevention); and third, developing new financial incentives to achieve these two goals. The second issue is particularly important in rapid industrializing regions like East Asia, where the industrial capital stock is turning over extremely rapidly (a recent World Bank study estimated that in the year 2010, 75% of Asian capital stock will be less than 15 years old) and providing a huge opportunity to avoid large future compliance and clean-up costs by "building in" cleaner production approaches. Presentations and discussion explored these three issues through an examination of the evolution of markets for environmental technology in developed and developing countries, barriers to technology transfer and development, and innovative mechanisms for financing transfer and development.

25. In developed countries, the market for environmental technologies emerged as a result of pollution-control laws and regulations introduced in the 1970s. During the early 1990s, the private market in environmental technologies matured, and in the mid-1990s profits and investment have stagnated and in some cases declined due to uncertainty about the future evolution of environmental policies and regulations. Future investments will likely focus on

improved process technologies. Experience from Italy, among other countries, indicates that cleaner process technologies can reduce both pollution and processing costs. There is a need to strengthen this incentive by shifting the emphasis of environmental regulatory programs toward greater use of economic instruments, which provide industries more flexibility in determining cost-effective means of achieving environmental objectives.

26. In developing and transition economy countries, market development is at an early stage, with most technologies purchased or licensed from developed country suppliers. It was pointed out that the market for environmental technologies is likely to grow particularly rapidly in Asia over the next 10-20 years, driven by the massive investment in new industrial capital stock. Opportunities will be particularly great in the energy, water, and waste management sectors.

27. Despite the presence of a well-established industry in the developed countries and strong and growing demand in many developing and transition economy countries, there are still significant barriers to the transfer, development, and commercialization of environmental technologies. The most fundamental barrier is technology suppliers' perceptions of low rates of return. The environmental technology industry is reluctant to enter a market when demand for its products is uncertain. The level and stability of demand depends in large part on the presence of effective national environmental policies and regulations. Strengthening environmental policies is thus critical to developing countries' efforts to attract improved technologies. It was suggested that well-designed economic instruments may generate more stable and sustainable demand than traditional command-and-control regulations.

28. Technology transfer and development are also impeded by several types of market imperfections. First, although environmental technologies are often not particularly high tech, they need to be tailored for particular uses, and this specialized character makes it difficult for potential buyers and sellers to identify each other. These barriers are particularly high for small and medium enterprises. Second, even where potential buyers and sellers can locate each other, potential sellers remain concerned about enforcement of patents and licensing agreements, particularly for formulae and process technologies which may be a major source of competitive advantage. Payments for technology are the necessary return on years of research and development. Third, development and commercialization of environmental technologies within many developing and transition economy countries is constrained by limited private and public funding for research and development programs.

29. Discussion of strategies to overcome obstacles to technology transfer and development identified several promising initiatives, in addition to improving environmental policies. UNEP's International Environmental Technology Center is a recent initiative to assist local governments in developing countries to identify and acquire urban and freshwater environmental management technologies. Bilateral programs, for example the US-Asia

Environmental Partnership, are assisting government and private sector actors in integrating environmental criteria and technological solutions in energy, water, and waste management investments. Experience with these and other public-private partnerships suggest that they can be effective in overcoming information and transaction cost barriers to technology transfer and development. As emphasized above, they are most likely to be effective when they are supported by national macroeconomic, trade, and environmental policies that reduce market and policy uncertainty and create strong demand for environmental technologies. Some participants also encouraged further exploration of proposals for the establishment of a publicly-supported "green technology fund." Such a fund could purchase technology patents and licensing rights and make them widely available in the public domain.

## V. INNOVATIVE INTERNATIONAL FINANCIAL MECHANISMS

30. Meeting the external financing requirements of Agenda 21 is a major challenge for the international community. As noted elsewhere, although ODA is an essential ingredient, it is unlikely to contribute more than a fraction of external financing needs. Over the past several years, international and national agencies and experts have devoted considerable attention and effort to identifying and analyzing mechanisms for mobilizing new and additional sources of external finance.

31. The expert group discussed several recent proposals for national taxes on carbon emissions, air transport, and foreign exchange transactions. They also noted the need for continuing efforts by multilateral development banks and aid agencies to integrate sustainable development goals and increase the financial leverage of public resources through innovative public-private partnerships.

32. Proposals for international taxes share a general conceptual framework: taxing economic activities that have negative global impacts (not necessarily limited to environmental impacts), and using the resultant revenue to finance sustainable development activities. The revenue and incentive impacts of particular taxes depend on level of the tax and the price elasticity of supply and demand for the activity being taxed. Some tax proposals, particularly the carbon tax, have potentially strong revenue and incentive effects. Others, particularly the air transport and foreign exchange taxes, appear to have relatively weak incentive effects, but substantial revenue-raising potential.

33. There was broad agreement that a carbon tax is a highly desirable tool because of its great incentive and revenue-raising potential. It could be levied on fossil fuel use, based on carbon content, and collected at the national level. A portion of the revenue collected could be used for domestic purposes, with the remainder channelled to international investments,

especially ones linked to reducing the risk of global climate change. The distributional impacts of the carbon tax might be highly uneven, however. To offset these impacts and related adjustment costs, a portion of the international revenues could be earmarked for countries bearing the highest adjustment burdens. The group recognized that short-run competitiveness concerns and concern about distributional impacts pose major obstacles to political acceptance of such a tax. There was broad agreement on the need to strengthen the case for a carbon tax by targeted education and information programs, including outreach to government agencies, political leaders, business and civic groups, and the media.

34. A tax on airline transportation has also been suggested in several fora. The group noted that the incentive effect of such a tax is not clear if it is assessed on airline revenue, and that its impact as a pollution reduction incentive would be greater if the tax were levied on the emissions of airline fleets, or on fuel consumption, rather than on revenues or passenger miles. Concerns were also raised about the relatively small contribution of airline travel to greenhouse gas emissions. On the other hand, there is no one dominant source of greenhouse gas emissions, and no reason in principle not to tax air travel along with other sources of emissions.

35. The group also discussed the potential revenue and incentive impacts and political feasibility of a tax on foreign exchange transactions (the "Tobin tax"). The initial rationale for the tax (in the 1970s) was to reduce speculative volatility in foreign exchange markets. Recent volatility in international capital markets has revived discussion of this tax. There has also been discussion of how its proceeds might be spent, including discussion of the possibility of using proceeds to finance sustainable development activities. Recent UNDP-supported research suggests that a tax of less than 0.5% levied on private foreign exchange trades and collected by national governments could generate approximately $150 billion per year, and could lead to modest reductions in exchange rate volatility. Part of the revenue could be made available for sustainable development investments. The group discussed several concerns about such a tax. First, it is not clear that foreign exchange market volatility is always negative. In some cases, it may provide important information to governments and the private sector about the need to clarify and stabilize monetary, fiscal, and exchange rate policies. Second, the degree to which a tax of the order proposed would reduce volatility is not clear. Third, it is not clear how much a foreign exchange tax would distort non-speculative decisions to invest in foreign exchange instruments, causing efficiency losses in trade and investment. Fourth, although there is no economic objection to using revenue raised from one sector to fund another, the lack of a clear link to sustainable development does raise questions about the appropriateness of using a capital markets tax for sustainable development activities. Further studies are needed to clarify the rationale for and potential impacts of the Tobin tax and to evaluate collection and disbursement options.

36. Discussion also stressed the need for continuing efforts by international financial institutions and aid agencies to integrate economic, social, and environmental criteria in all of

their programs in order to promote sustainable development. Previous discussions of private sector capital mobilization (section I above) and technology transfer (section IV above) highlighted many opportunities for increasing the leverage of international public funds by promoting private sector co-finance, and by working more closely with small and medium enterprises and NGOs.

## VI. MATRIX OF POLICY OPTIONS AND FINANCIAL INSTRUMENTS

37. The "matrix approach" to policy analysis for sustainable development identifies a range of policy options appropriate for financing sustainable development activities in particular contexts. It facilitates policy analysis by showing how different types of policy options (e.g. property rights, taxes, subsidy reductions) can be applied at different levels of governance (e.g. national, regional, global) and economic activity (e.g energy, agriculture, waste management). The matrix approach offers several advantages. First, it responds to the need for action at multiple levels of governance and economic activity by identifying options at several levels. Second, the matrix indicates how actions at multiple levels can be integrated across and within levels to achieve complementarities and synergies. Third, in so doing it identifies opportunities for minimizing administrative costs by deploying the most concise set of instruments needed to achieve investment objectives. Fourth, within each cell it provides a summary of promising opportunities, and associated experience, with financing related to specific sectors, sources, and instruments. Fifth, in so doing, it provides a menu from which decisionmakers in the public and private sectors can quickly review the full range of options available and select those that are most appropriate. Sixth, the presentation of a range of options is important for the additional reason that a series of instruments is likely to be necessary in any particular case to ensure cost-effective financing (particular instruments are typically most cost-effective only within a specific range). Seventh, it ensures a balance between financial needs and financing options.

38. The presentation highlighted actual experience with incentive-based financial mechanisms. More than thirty countries worldwide have implemented innovative mechanisms, with more than two-thirds having moved beyond the experimental stage toward broad-based implementation. The numbers are considerably larger if more traditional incentive mechanisms, such as subsidy reductions and pollution charges, are included. Experience indicates that implementation has generated social as well as economic and environmental benefits.

39. Discussion focused on suggestions for improving the matrix approach, including: (i) developing more precise estimates of the actual magnitude of environmentally damaging subsidies, current and projected environmental damages associated with economic activity, and the benefit-cost ratio for environmental investments and economic instruments; (ii) incorporating more explicit links to conventional regulatory approaches and the stimulation of

technological innovation and changes in production and consumption patterns; and (iii) converting the matrix into a user-friendly, easily-accessible, computer-based information system.

## RECOMMENDATIONS FOR ACTION

40. **Private capital flows** - To mobilize and sustain flows of private capital from domestic and international sources for investments in sustainable development, governments should protect private property rights; adopt macroeconomic and environmental policy frameworks that are clear, credible, and stable; make greater use of BOT, BOO, and similar mechanisms for financing environmental infrastructure; and consider including environmental criteria in their procurement requirements. International financial institutions should offer more line-of-credit facilities linked to sustainable development activities, implement innovative approaches utilizing not just their debt and equity participation but also other mechanisms that are commonly used in other sectors (e.g., cofinancing and guarantees), and in other ways leverage new and additional private capital participation. At the more micro level, international agencies and financial institutions, governments, the private sector, and NGOs should work together to develop and implement technical assistance programs that reduce transaction costs, market risks, information gaps, concerns about unauthorized replication of technology, and other impediments obstructing these flows. Program elements might include establishing revolving funds for preinvestment studies, strengthening information clearinghouses, disseminating case study research on innovative investment arrangements, and preparing regional and national investment action plans.

41. **Pollution abatement funds** - To ensure that earmarking and soft finance do not lead to misallocation of funds, pollution abatement funds should make greater use of project evaluation techniques like benefit-cost analysis and cost-effectiveness analysis, require cost-sharing by fund recipients, and increasingly "harden" their disbursement terms. Funds that are structured as comprehensive funds (i.e., ones that are not limited to expenditure on pollution abatement), as in many transition economies, should increasingly shift their expenditure toward more legitimate public goods, such as nature protection. International organizations and international financial institutions should provide technical assistance to assist funds in making these changes.

42. **Conservation trust funds** - To identify the conditions under which conservation trust funds can be cost-effective mechanisms for protecting natural areas, a detailed cross-country performance review should be undertaken. The study should add to existing, predominantly descriptive information by evaluating the institutional requirements, setup costs, operational performance, and domestic and international resource mobilization potential of a representative sample of funds. It should compare the performance of funds with the performance of

governmental conservation programs financed through standard budgetary and aid channels.

43. **Regional sustainable development funds** - To further investigate the desirability of establishing regional sustainable development funds, a feasibility study for one or more regions should be conducted. The study should investigate the rationale for such funds (i.e., the existence of regional externalities not currently addressed by other funds, e.g., the GEF), the ability of such funds to maximize the use of partnerships with the private sector and NGOs, the risks that such funds might divert financial resources from existing bilateral and multilateral initiatives, and the scope for increasing the net availability of financial resources for cost-effective initiatives.

44. **Economic instruments** - To promote sustained private sector involvement in the financing of sustainable development and the transfer of environmental technology, and to reduce the cost of environmental protection, governments should increasingly shift their regulatory approach toward economic instruments. They should pay particular attention to opportunities to make this shift provided by broader tax reform efforts. To increase governmental and public understanding of the potential benefits of this shift, case studies of practical experience at the local, national, and regional levels (which is considerable) should be commissioned. The case studies should take full advantage of information in existing studies. Dissemination of the case studies should be combined with targeted technical assistance programs that allow interested agencies to share experience, develop analytic and implementation capacity, and undertake pilot projects to determine how economic instruments need to be adapted to particular circumstances and contexts.

45. **Subsidy reduction** -To move domestic and international market prices toward full-cost pricing levels, governments should implement targeted reductions of subsidies that reduce economic efficiency and cause environmental degradation. To determine the appropriate targeting, timing, and administration of subsidy reduction, studies of previous experience with subsidy reduction, e.g. under programs of structural adjustment and for compliance with international trade agreements, should be conducted. These studies should examine the magnitude of subsidies, the technical, political, and administrative strategies adopted to reduce them, the economic, environmental, and social impacts of reduction both domestically and internationally, and opportunities to delink subsidies from environmentally damaging activities while maintaining financial support for subsidy recipients, particularly those in socially vulnerable groups (e.g., by switching to direct income support). The results of this case study research should be combined with targeted programs of technical assistance that assist governments in developing pilot subsidy reduction projects at the local and/or regional level.

46. **Financing technology transfer** - To create a more predictable and "investor friendly" market that will facilitate technology transfer, especially the transfer of cleaner and safer technologies, governments should follow the general strategy outlined in para. 40 above, viz.

protect private property rights, adopt clear, credible, and stable macroeconomic and environmental policies (especially ones based on economic instruments), and consider including environmental criteria in their procurement requirements. In addition, international agencies and financial institutions, governments, the private sector, and NGOs should work together to protect against patent and license infringement, and to develop and implement technical assistance programs that help buyers and sellers of technology identify each other, reduce preinvestment costs by providing technical, financial, and legal expertise, and identify and support projects that demonstrate and commercialize environmentally sustainable technologies in specific sectors.

47. **National carbon taxes** - To reduce emissions of both global pollutants (e.g., carbon dioxide) and local pollutants (e.g., sulfur dioxide, particulates, and hydrocarbons), to reduce discrimination against renewable energy sources, to promote transfer of energy technologies, and to raise revenue for direct investments in sustainable development activities, more countries should consider implementing national taxes on the carbon content of fossil fuels. To increase the political feasibility of these taxes, studies of the economic and environmental benefits of carbon taxes in countries that have implemented them, or are considering implementing them, should be undertaken.

48. **Voluntary, multilateral consultations on subsidy reductions and introduction of national carbon taxes** - To minimize the potential distributional and competitiveness impacts of some of the policies recommended above, especially those related to subsidy reductions and national carbon taxes, interested governments should consider initiating voluntary, multilateral consultations for taking these steps toward sustainable development. This proposal was discussed in detail at the Second Expert Group meeting; more information is contained in the report of that meeting.

49. **International Financial Mechanisms** - to finance sustainable development activities on a global basis, taxing/charging economic activities that have identifiable negative global environmental impact in particular should be seriously considered, despite the lack of an international mechanism to do so. Proposals such as the carbon tax (collected at national level but with pre-determined criteria for global revenue sharing, on a earmarked basis) offer strong possibilities; while others (e.g. charge on international air transport) need clearer rationalisation and amplification in terms of their incentive effects despite significant revenue-raising potential. Still others (e.g. Tobin tax) require more detailed examination in order to qualify as a serious option.

50. **Matrix approach to policy instruments for financing sustainable development** - To assist governments and other sustainable development stakeholders in more easily identifying, learning about, and sharing experience with policy options for financing sustainable development, the development of a world wide web site for the matrix should be supported.

The web site should be maintained as a continually updated database of specific examples of the use of economic instruments in a wide variety of sectors, regions, and levels of government. It should be structured in such a way that users can electronically access increasingly detailed information about actual applications of policy instruments by exploring different levels of the matrix. Information should include both positive and negative aspects of implementation experience, as well as institutional obstacles and how they were overcome. To strengthen the value of the matrix approach, support should be provided to modify it to depict more explicitly the links among instruments (including more conventional regulatory approaches), technology transfer, and changes in consumption and production patterns. Support should also be given to develop and disseminate macroeconomic models for simulating the economic, financial, social, and environmental impacts of alternative packages of economic instruments at the sectoral, national, and global levels.

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